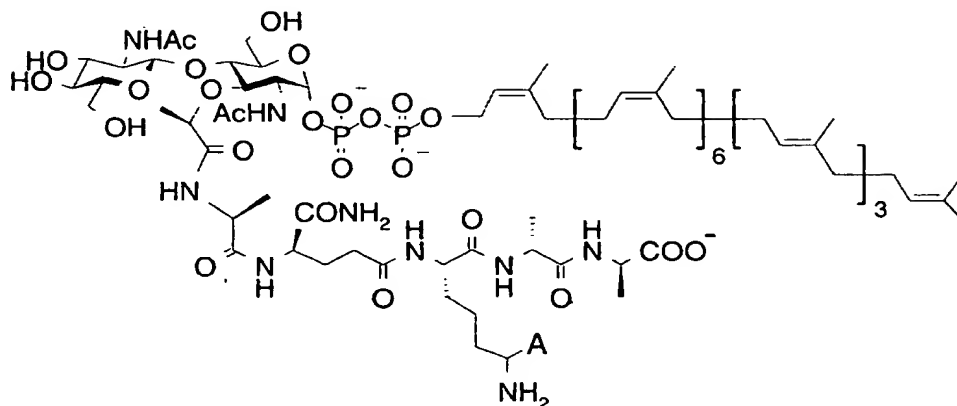


## WE CLAIM:

1. A non-radioactive, isolated, Lipid II compound of the following formula:



5

3W<sup>+</sup>

wherein:

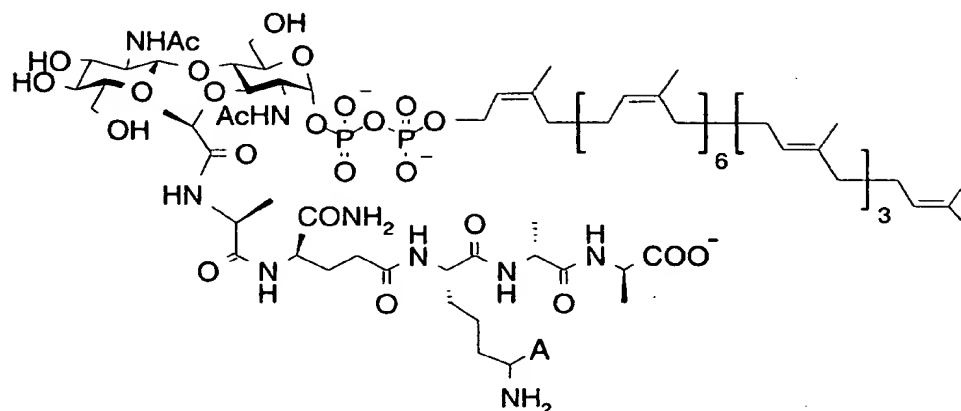
A is a hydrogen or a carboxyl group;

Ac is -C(O)CH<sub>3</sub>; and

W<sup>+</sup> is each independently a proton or cation selected from the group consisting of an alkali metal, alkaline earth metal, ammonium, alkyl ammonium, and dialkyl ammonium.

10

2. An isolated Lipid II compound having a purity greater than or equal to 50% of the following formula:

3W<sup>+</sup>

wherein:

A is a hydrogen or a carboxyl group;

Ac is -C(O)CH<sub>3</sub>; and

- 5        W<sup>+</sup> is each independently a proton or cation selected from the group consisting of an alkali metal, alkaline earth metal, ammonium, alkyl ammonium, and dialkyl ammonium.

3.        The isolated Lipid II compound of Claim 2, wherein  
10        said Lipid II compound has a purity greater than or equal to 60%.

4.        The isolated Lipid II compound of Claim 2, wherein  
15        said Lipid II compound has a purity greater than or equal to 70%.

5.        The isolated Lipid II compound of Claim 2, wherein  
said Lipid II compound has a purity greater than or equal to 80%.

6. The isolated Lipid II compound of Claim 2, wherein said Lipid II compound has a purity greater than or equal to 90%.

5

7. The isolated Lipid II compound of Claim 2, wherein said Lipid II compound has a purity greater than or equal to 95%.

10

8. The isolated Lipid II compound of Claim 2, wherein said Lipid II compound has a purity greater than or equal to 98%.

15

9. The isolated Lipid II compound of Claim 2, wherein said Lipid II compound has a purity greater than or equal to 99%.

20

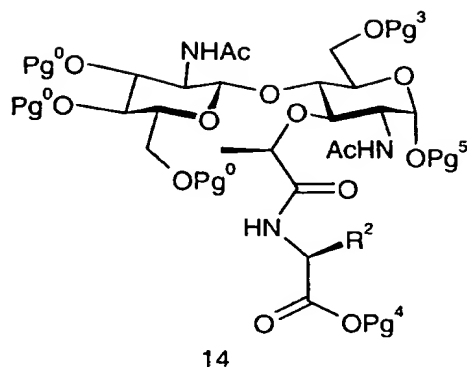
10. The isolated Lipid II compound of Claim 2, wherein said Lipid II compound has a purity greater than or equal to 99.5%.

11. A process for preparing a Lipid II compound, comprising:

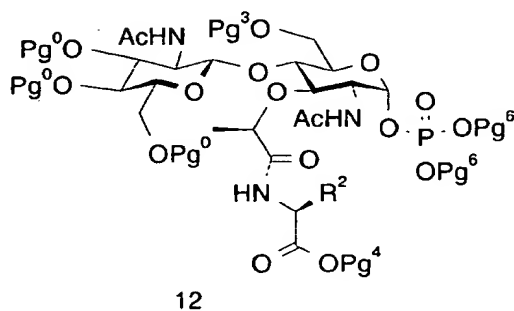
(1) providing a protected disaccharide core of formula

25 14

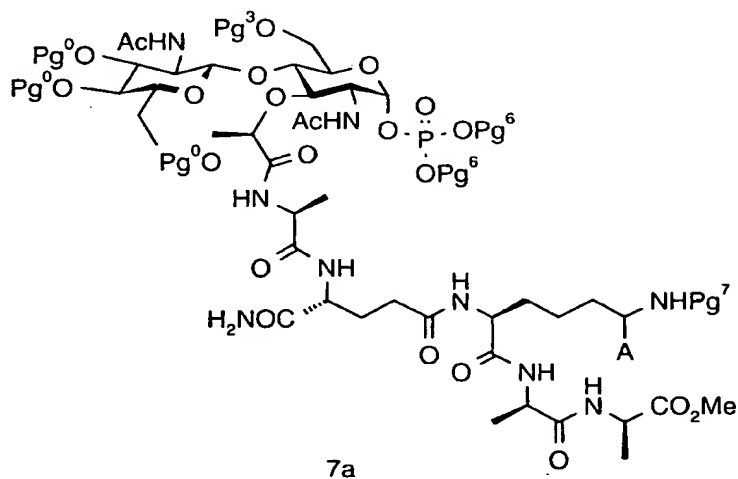
-98-



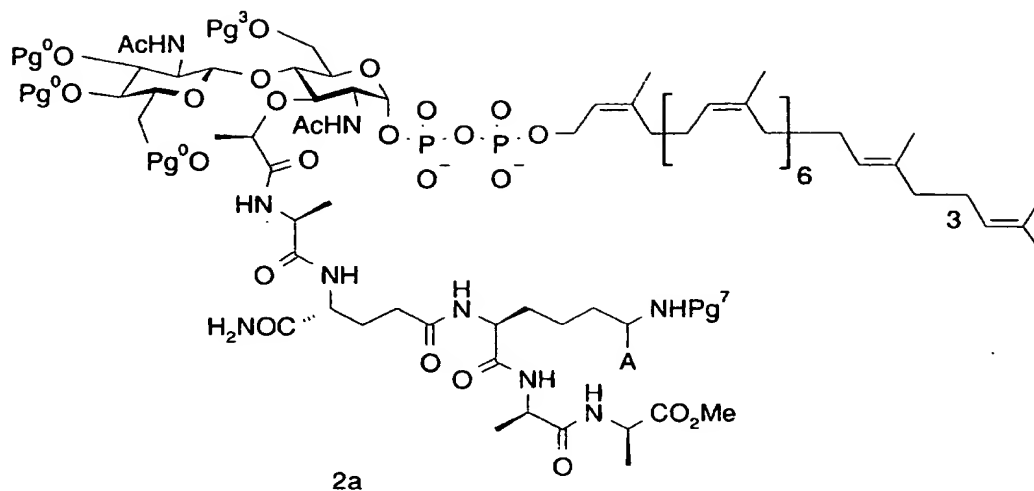
(2) introducing an anomeric phosphate to form a compound of formula 12



5 (3) introducing a polypeptide linkage to form a compound of formula 7a



(4) introducing an undecaprenyl diphosphate linkage to form a compound of formula 8a



(5) removing  $\text{Pg}^0$ ,  $\text{Pg}^3$ ,  $\text{Pg}^7$ , and  $\text{Pg}^8$  to form said Lipid II compound;

wherein:

- 5           A is hydrogen or a carboxyl group;
- $\text{R}^2$  is methyl;
- Ac is  $-\text{C}(\text{O})\text{CH}_3$ ;
- $\text{Pg}^0$  is an acyl hydroxy-protecting group;
- $\text{Pg}^3$  is an acyl hydroxy-protecting group;
- 10           $\text{Pg}^4$  is a carboxy-protecting group;
- $\text{Pg}^5$  is a hydroxy-protecting group;
- $\text{Pg}^6$  is a phosphate protecting group;
- $\text{Pg}^7$  is an amine-protecting group; and
- $\text{Pg}^8$  is a carboxy-protecting group.

15

12. A Lipid II compound prepared by the process of Claim 11.

13. A process for isolating Lipid II comprising  
isolating said Lipid II at a pH greater than 6.

14. The process of Claim 13 wherein said pH is between  
5 6 and 12.

15. The process of Claim 14 wherein said pH is between  
7 and 10.

10 16. The process of Claim 15 wherein said pH is between  
7 and 9.

15 17. The process of Claim 13, wherein said Lipid II has  
a purity greater than or equal to 50%.

18. The process of Claim 13, wherein said Lipid II has  
a purity greater than or equal to 60%.

20 19. The process of Claim 13, wherein said Lipid II has  
a purity greater than or equal to 70%.

20. The process of Claim 13, wherein said Lipid II has  
a purity greater than or equal to 80%.

25 21. The process of Claim 13, wherein said Lipid II has  
a purity greater than or equal to 90%.

22. The process of Claim 13, wherein said Lipid II has a purity greater than or equal to 95%.

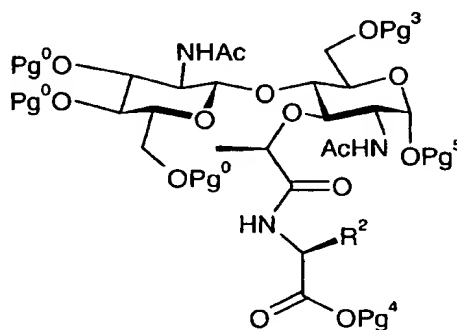
5        23. The process of Claim 13, wherein said Lipid II has a purity greater than or equal to 98%.

24. The process of Claim 13, wherein said Lipid II has a purity greater than or equal to 99%.

10

25. A process for preparing a Lipid substrate, comprising:

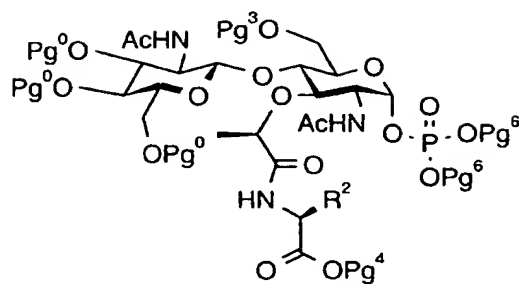
(1) providing a protected disaccharide of formula 14



14

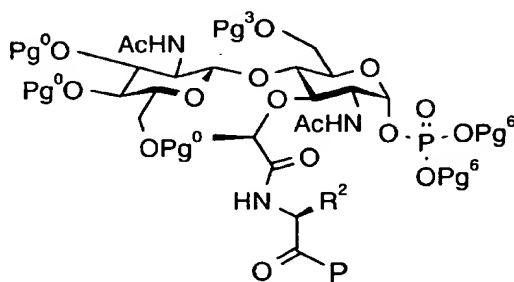
15        (2) introducing an anomeric phosphate to form a compound of formula 12

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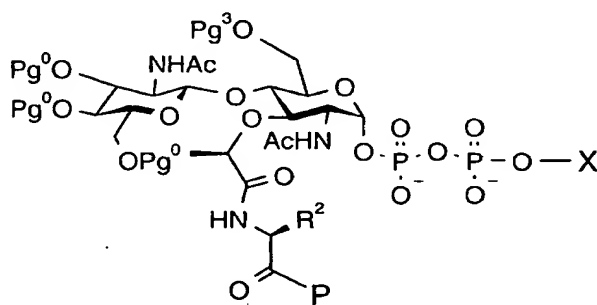
12

(3) introducing a peptide linkage to form a compound of formula 7



7

5 (4) introducing a lipid-carrier diphosphate linkage to form a compound of formula 2

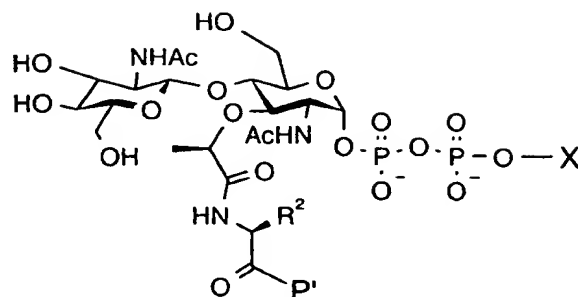


2

(5) removing the Pg<sup>0</sup> and Pg<sup>3</sup> groups and deprotecting the P group to produce a lipid substrate of formula 1



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1

wherein:

Ac is  $-\text{C}(\text{O})\text{CH}_3$ ;

$\text{Pg}^0$  is an acyl hydroxy-protecting group;

5  $\text{Pg}^3$  is an acyl hydroxy-protecting group;

$\text{Pg}^4$  is a carboxy-protecting group;

$\text{Pg}^5$  is a hydroxy-protecting group;

$\text{Pg}^6$  is a phosphate-protecting group;

$\text{R}^2$  is hydrogen,  $(\text{C}_1\text{-C}_5)$  alkyl or  $(\text{C}_1\text{-C}_3)$

10 alkylphenyl;

X is a lipid carrier;

P attached to the carbonyl is a residue of an amino acid or peptide, wherein P comprises a protected terminal carboxy group; and

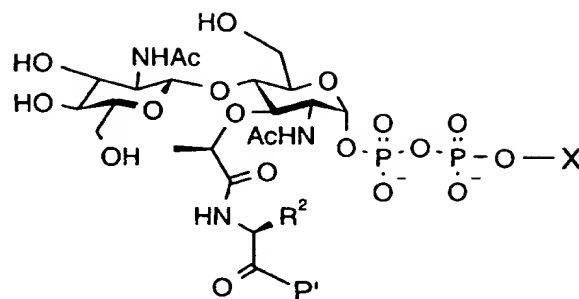
15  $\text{P}'$  is a residue of an amino acid or peptide.

26. A Lipid substrate prepared by the process of Claim

25.

20 27. A lipid II analog of formula 1

-104-



1

wherein:

Ac is  $-\text{C}(\text{O})\text{CH}_3$ ;

$\text{Pg}^0$  is an acyl hydroxy-protecting group;

5  $\text{Pg}^3$  is an acyl hydroxy-protecting group;

$\text{Pg}^4$  is a carboxy-protecting group;

$\text{Pg}^5$  is a hydroxy-protecting group;

$\text{Pg}^6$  is a phosphate-protecting group;

$\text{R}^2$  is hydrogen,  $(\text{C}_1\text{-C}_5)$  alkyl or  $(\text{C}_1\text{-C}_3)$

10 alkylphenyl;

X is a lipid carrier;

P attached to the carbonyl is a residue of an amino acid or peptide, wherein P comprises a protected terminal carboxy group; and

15  $\text{P}'$  is a residue of an amino acid or peptide.